Bertrand’s postulate states that there is always a prime in the interval \([x, 2x]\) for any \(x \geq 1\). Applying the prime number theorem, one may further show that there is approximately \(\int_x^{2x} \frac{dt}{\log t}\) primes in \([x, 2x]\) for sufficiently large \(x\). There is a more difficult question concerning the distribution of primes \(p\) in short intervals when \([x, 2x]\) is replaced by \([x, x + h]\) for some \(h \leq x\) and \(p\) is required to be congruent to \(a\) modulo \(q\) for some \((a, q) = 1\). In this talk, we will discuss how short \([x, x + h]\) can be. If time allows, we will sketch a proof of the Bombieri-Vinogradov theorem in short intervals, which answers such a question.

EVERYONE IS WELCOME!

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